Mr. Michael T. Davis WLPCS Calculus	Section 4.2 Quiz February 9, 2018

Name: Solutions / Answers

1. You must show all the steps in your work. Find y' given $y+\cos y=x$

$$y' + -\sin y \cdot y' = 1$$

$$y'(1-\sin y) = 1$$

$$y' = \frac{1}{1-\sin y}$$

2. You must show all the steps in your work. Find $\frac{dy}{dx}$ given $\frac{y^2}{2}+2x-4y=1$

$$\frac{2y\cdot y'}{2} + 2 - 4y' = 0$$

$$yy' - 4y' = -2$$

$$y'(y-4) = -2$$

$$y' = \frac{-2}{y-4}$$

3. You must show all the steps in your work. Find y' given $x=\sin^2 y$

$$1 = 2\sin y \cdot \cos y \cdot y'$$

$$\frac{1}{2\sin y \cos y} = y'$$

4. Find $\frac{dy}{dx}$ given $x = y^2 + 4y - 6$

$$1 = 2y \cdot y' + 4y'$$

$$1 = y'(2y + 4)$$

$$\frac{1}{2y+4} = y'$$

5. You must show all the steps in your work. Find y' and the slope of the curve of $x^3 + y^3 = 7$ at the point $(-1,2)$

$$3x^2 + 3y^2 \cdot y' = 0$$

$$3y^2 y' = -3x^2$$

$$y' = \frac{-3x^2}{3y^2}$$

$$y' = \frac{-x^2}{y^2}$$

at $(-1, 2)$

$$y' = \frac{-(-1)^2}{2^2}$$

$$y' = \frac{-1}{4}$$

6. You must show all the steps in your work. Find y' given $2x^{\frac{3}{2}} + x\tan y = y$

$$\frac{3}{2} \cdot 2x^{\frac{1}{2}} + \tan y + x\sec^2 y \cdot y' = y'$$

$$3\sqrt{x} + \tan y = y' - x\sec^2 y \cdot y'$$

$$3\sqrt{x} + \tan y = y'(1 - x\sec^2 y)$$

$$\frac{3\sqrt{x} + \tan y}{1 - x\sec^2 y} = y'$$

7. You must show all the steps in your work. Find an equation of the line that is tangent to the curve of $2xy+\pi\sin y=2\pi$ at the point $\left(1,\frac{\pi}{2}\right)$

$$2y + 2xy' + \pi\cos y \cdot y' = 0$$

$$y'(2x + \pi\cos y) = -2y$$

$$y' = \frac{-2y}{2x + \pi\cos y}$$

at $(1,\frac{\pi}{2})$ $\quad y' = \dfrac{-\pi}{2 + \pi\cos\frac{\pi}{2}} = \dfrac{-\pi}{2+\pi(0)} = -\frac{\pi}{2}$

$$y - \frac{\pi}{2} = -\frac{\pi}{2}(x-1)$$

8. You must show all the steps in your work. Find $\frac{dy}{dx}$ given $x^2-xy+y^2=1$.

a. $\frac{2x+y}{x-2y}$ b. $\frac{y+2x}{2y-x}$ c. $\frac{2x}{x-2y}$

(d.) $\frac{y-2x}{2y-x}$ e. $\frac{y+2x}{x}$ f. None of these

$$2x - y - xy' + 2y\cdot y' = 0$$

$$2y\cdot y' - xy' = y - 2x$$

$$y'(2y - x) = y - 2x$$

$$y' = \frac{y-2x}{2y-x}$$

9. You must show all the steps in your work. Given the relation $x^2+y^2=64$, then $\frac{d^2y}{dx^2}=$

a. $\frac{y^2-x^2}{y^3}$ (b.) $-\frac{y^2+x^2}{y^3}$ c. $\frac{y^2+x^2}{y^3}$

d. $\frac{-y^2+x^2}{y^3}$ e. $\frac{-y^2-x^2}{y^2}$ f. None of these

$$2x + 2y\cdot y' = 0$$

$$2y\cdot y' = -2x$$

$$y' = \frac{-2x}{2y}$$

$$y' = \frac{-x}{y}$$

$$y'' = \frac{-1\cdot y - (-x)y'}{y^2}$$

$$y'' = \frac{-y + x\left(\frac{-x}{y}\right)}{y^2}$$

$$y'' = \frac{\frac{-y^2}{y} - \frac{x^2}{y}}{y^2}$$

$$y'' = \frac{-y^2-x^2}{y^3} = -\frac{y^2+x^2}{y^3}$$

Optional Extra Credit

You must show all the steps in your work. Given the relation $x^2 - xy + y^2 = 1$, then $\frac{d^2y}{dx^2} =$

$$2x - y - xy' + 2yy' = 0$$

$$2yy' - xy' = y - 2x$$

$$y'(2y - x) = y - 2x$$

$$y' = \frac{y - 2x}{2y - x}$$

$$y'' = \frac{(y' - 2)(2y - x) - (y - 2x)(2y' - 1)}{(2y - x)^2}$$

$$y'' = \frac{2yy' - xy' - 4y + 2x - (2yy' - y - 4xy' + 2x)}{(2y - x)^2}$$

$$y'' = \frac{2yy' - xy' - 4y + 2x - 2yy' + y + 4xy' - 2x}{(2y - x)^2}$$

$$y'' = \frac{3xy' - 3y}{(2y - x)^2}$$